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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
PALENIK, JEFFREY T	

ART UNIT	PAPER NUMBER
1615	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/517,208	GLADMAN ET AL.	
	Examiner	Art Unit	
	Jeffrey T. Palenik	1615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-25* is/are pending in the application.

4a) Of the above claim(s) *7-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-6,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

STATUS OF THE APPLICATION

Receipt is acknowledged of Applicants' Amendments and Remarks filed 30 November 2009. The Examiner acknowledges the following:

Claims 5 has been amended to further specify lanolate, myristate and palmitate as the isopropyl species. Support for the amendment is found in the instant disclosure. The amendment to claim 24 removes the superfluous recitation of a pharmaceutical.

No claims have been added or cancelled.

The Examiner acknowledges that no new matter has been added to the claims.

Thus, claims 1, 2, 4-6, 24 and 25 continue to represent all claims currently under consideration.

INFORMATION DISCLOSURE STATEMENT

No new Information Disclosure Statement (IDS) have been submitted for consideration.

WITHDRAWN OBJECTIONS/REJECTIONS

Rejections under 35 USC 112

Applicants' amendments to claims 5 and 24 are sufficient enough to overcome the rejections. Thus, said rejections have both been **withdrawn**.

MAINTAINED REJECTIONS

The following rejection is maintained from the previous Office Correspondence dated 31

July 2009 since the art which was previously cited continues to read on the amended limitations.

CLAIM REJECTIONS - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Hiestand et al. (USPN 3,549,555) and Barnett et al. (USPN 4,999,198) further in view of Macaulay (USPN 3,016,308) and Wheeler (USPN 6,165,479).

The instantly amended base claim is drawn to a powder whose particles comprise biliquid foam droplets encapsulated by a polymeric matrix material. The droplets, which comprise both an oil and continuous phase and have a mean size ranging from 1-45 microns. The overall fine powder particles are recited as having a size range of 5-150 microns.

Hiestand teaches a process for encapsulating a hydrophobic liquid-in-aqueous liquid (e.g. oil-in-water) emulsion within a wall-forming polymeric material (Abstract). The "primary emulsion" is taught as referring to the lipophilic liquid-in-hydrophilic liquid emulsion, where either or both of the phases may have additional ingredients dissolved or suspended within (col. 4, lines 16-20) such as an active pharmaceutical, cosmetic or nutritional substance (col. 3, lines 60). The emulsion is further taught as comprising emulsifying agents such as sorbitan derivatives and polyoxyethylene derivatives (col. 4, lines 29-32). The wall-forming polymer material is taught as being composed of a macromolecular polymer whose key property is that it does not intermix with the external phase of the emulsion; the two are immiscible (col. 4, lines 65-71).

Regarding the instantly claimed dimensions, for both the inner droplet and the overall particle size, Hiestand is silent save for teaching that the size of the particle is dependent on two factors. First, the overall size is dependent on the degree of dispersion or size of the emulsion particles, and second, that the end particle size is a function of the thickness of the coacervate

coating (e.g. the wall thickness). Hiestand is further silent to the use of a biliquid foam (e.g. polyaphrons) as the liquid which is encapsulated within the particles formed.

Barnett teaches the formation of polyaphron-based drug delivery systems wherein the drug is carried in the disperse phase (Abstract). Polyaphrons are defined as multi-phase systems consisting of a dispersion of suspended tiny droplets ranging in size between about one micron to about one millimeter encased in a continuous phase (col. 1, lines 22-25). The polyaphrons of the Barnett reference are specifically directed to those where water is the continuous phase and selected oils are the disperse or suspended phase. Either water- or oil-soluble surfactants may be incorporated into the system (col. 1, lines 55-65). Barnett also expressly suggests that a polymer matrix may be formed about the outside of the polyaphron in order to precisely control the release rate of the drug dispersed therein (col. 3, lines 53-61). These compounds are referred to as thickening agents and they are taught as including, for example, sodium alginate (col. 3, lines 39-41). It is further taught that when the continuous phase is aqueous other soluble polymeric thickening agents may include alginates and starches (col. 4, lines 1-3).

It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the invention was made to have substituted the drug-loaded polyaphron composition which is taught by Barnett for the drug-loaded, oil-in-water emulsion which is coated in the invention of Hiestand. Polyaphrons (i.e. biliquid foams) and emulsions are taught in the art as being distinct compositions on the basis of the number of interfaces which separate the suspended or discontinuous phase from the continuous aqueous phase (see Sebba, USPN 4,486,333; col. 1,

lines 31-47). However, despite this physical difference, the ordinarily skilled artisan would have been highly motivated to substitute a biliquid foam for an oil-in-water emulsion, particularly since the two compositions are chemically homologous. Both compositions fundamentally contain an aqueous continuous phase, an oil-based discontinuous or droplet phase, and a surfactant. Thus the skilled artisan would have a reasonably high expectation that both compositions would be capable of encapsulation by a wall-forming polymeric material as taught by Hiestand. The skilled artisan would be further motivated to incorporate a biliquid foam particularly where it involves the administration of pharmaceuticals and/or cosmetic compositions embedded therein, as evidenced by Wheeler (USPN 6,165,479). Wheeler explains that a further disadvantage to using an emulsion is that the amount of surfactant is high enough to diminish the efficacy of many of the essential preservatives found within emulsion formulations. To overcome this, the amount of preservatives is increased ultimately resulting in skin-sensitization and exacerbation of skin problems (col. 1, lines 34-41). Thus, the advantage to using a biliquid foam over an emulsion, particularly for cosmetic or pharmaceutical purposes, stems from the basis that biliquid foams are less irritating due to their lower levels of surfactants (col. 2, lines 25-32).

Regarding the droplet and particle size ranges, Barnett expressly teaches that the polyaphron suspended phase consists of droplets which range in size from about one micron to one millimeter, as discussed above. However, none of the references expressly teach the size range of the overall powder particles, as claimed by Applicants. However, the values and formats for each these parameter with respect to the claimed composition are adjustable, it follows that each is a result-effective parameter that a person having ordinary skill in the art

would routinely optimize. Optimization of parameters is a routine practice that would be obvious for a person of ordinary skill in the art to employ. For example, also as discussed above, Hiestand expressly teaches that one of the factors contributing to the overall size of the discrete particles (e.g. encapsulated emulsion) is the degree to which the coacervate is allowed to form the wall about the emulsion. However, the formation of discrete particles containing a dispersible liquid in the size range claimed by Applicants is well-known in the art as evidenced by the teachings of Macaulay (USPN 3,016,308). Claim 11, for example, teaches a free-flowing powder of microscopic discrete rupturable capsules having a particle size ranging from about 0.1 microns to about 70 microns in diameter. The particles are taught as being formed from an emulsion which is later encased within a shell which may be formed from various film-forming polymers, some of which are well-known pharmaceutically acceptable compounds (e.g. casein, cellulose derivatives, carboxymethyl cellulose, etc.) (col. 5, lines 43-51). Thus, it would have been customary for an artisan of ordinary skill, to adjust the sizes of both the droplet and overall particle of the composition, particularly in view of Barnett and Macaulay, in order to achieve the desired discrete particles. Thus, absent some demonstration of unexpected results from the claimed parameters, optimization of any of these parameters would have been obvious at the time of Applicants' invention.

Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiestand et al. with respect to claim 1, as set for above.

Claim 2 recites that the powder composition which is formed is done so via spray-drying, freeze-drying (e.g. lyophilization) or fluidized bed granulation. The limitations of the claim are

broadly and reasonably considered by the Examiner as being product-by-process limitations, which, per MPEP §2113 is an attempt to further limit an inventive composition in terms of the means by which it is made. Despite this interpretation, the Examiner respectfully points out that Hiestand expressly teaches that preparation of the walled particles is followed with a drying step which may be accomplished using several different techniques which include either spray-drying or freeze-drying (col. 7, lines 17-23).

Claim 4 recites limitations to the polymeric material used to encapsulate the instantly claimed biliquid foam. The limitations of this claim are met where Hiestand teaches that the coacervate or wall-forming polymer(s) used include such compounds as gelatin and acacia (Ex. 3; col. 7, line 70 to col. 8, line 4; Ex. 1, col. 8, lines 60-67). Example 3 (col. 9, lines 30-55) also expressly teaches using sodium alginate to form the polymer-based wall.

The skilled artisan would have been highly motivated to incorporate the additional teachings of Hiestand, particularly in view of the aforementioned similarities between emulsions and biliquid foams. Given that the two compositions are similar in their chemical composition, as discussed above, the ordinarily skilled artisan would have a reasonable expectation of successfully encapsulating the biliquid foam using those polymeric wall-forming materials which are taught by Hiestand. It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the invention was made to have formed the encapsulating wall using the polymers and drying techniques expressly taught by Hiestand to prepare the instantly claimed polymeric-encapsulated biliquid foam particles as instantly claimed.

Claims 5, 6, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiestand et al., with respect to claim 1 as set forth above, as further evidenced by Wheeler (USPN 6,165,479).

Claim 5 recites limitations to the water-immiscible internal oil phase of the biliquid foam. Claim 6 recites that said oil is present between 5-50% by weight based on the weight of the ensuing powder. Claims 24 and 25 recite that the internal oil phase of the composition comprises different forms of active compounds such as pharmaceuticals.

Hiestand expressly teaches the limitations of claims 24 and 25 such that the encapsulated composition may have embedded within it a variety of materials designed to be controllably-released. Such compounds include nutritional compounds (e.g. vitamins), cosmetics, and pharmaceuticals (col. 3, lines 40-61). Regarding the limitations of claims 5 and 6, Hiestand teaches the use of oils such as lanolin, soybean and mineral oils (col. 4, lines 21-28). More specifically, Example 3 (col. 9) teaches the formation of an emulsion which comprises approximately 50% by weight of mineral oil. The formed emulsion particles are encapsulated within a sodium alginate polymeric wall and hardened via freeze-drying.

Thus, it would have been *prima facie* obvious to an artisan of ordinary skill at the time the invention was made to have incorporated a water-immiscible compound such as mineral oil in the amounts claimed by Applicants as well as an active pharmaceutical compound, and expect to arrive at the instantly claimed invention. The ordinarily skilled artisan would have been highly motivated to incorporate an oil such as mineral oil particularly in view of the

aforementioned similarities between biliquid foams and emulsions. Further with regards to the similarities between the two compositions, Wheeler teaches many of the instantly claimed oils which may be used to form the suspended droplets of a biliquid foam, namely lanolin, soybean and mineral oils (col. 2, lines 47-55) are the same as those which are expressly taught by Hiestand. Wheeler also teaches that biliquid foams are known in the art as containing up to 95% by volume of the oil component (col. 2, lines 15-20), a range which reads on and encompasses the amount which is instantly claimed. The teachings of Hiestand (Ex. 3, col. 9) teach incorporating approximately 50% by weight of mineral oil in the encapsulated emulsion.

Thus, based on the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, alone or in combination, especially in the absence of evidence to the contrary.

RESPONSE TO ARGUMENTS

Applicants' arguments with regard to the rejection of claims 1, 2, 4-6, 24 and 25 under 35 USC 103(a) as being unpatentable over the combined teachings of Hiestand et al. and Barnett et al. in further view of Macaulay and Wheeler have been fully considered but they are not persuasive.

Applicants traverse the rejections initially pointing out that Hiestand is silent to the use of biliquid foams (polyaphrons) and that Barnett is silent to the use polyaphrons in the form of powders. Applicants further allege a lack of motivation for combining the references on the

grounds that Barnett "provides very limited instructions on the preparation of biliquid foams and no formal examples" (Remarks, pg. 8, last paragraph). Applicants also assert that Barnett "suggests that in some circumstances biliquid foams are unstable".

In response to Applicants' arguments against the references individually (i.e. Barnett), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, the Examiner respectfully submits that the combined teachings teach and suggest two things to the ordinarily skilled artisan. First, the encased emulsion compound taught by Hiestand and the polyaphron composition taught by Barnett, absent the physically interactive differences, appear to be the same composition, or least chemically homologous (i.e. both appear to be a form of emulsion). Second, when considered in light of the teachings of Hiestand, the ordinarily skilled artisan would be motivated to substitute the polyaphron composition of Barnett for the emulsion of Hiestand, particularly since the wall-forming polymer material of Hiestand is taught as being composed of a macromolecular polymer whose key property is that it does not intermix with the external phase of the emulsion; the two are immiscible (col. 4, lines 65-71). That is to say it is not expected that the material will interact with its contents. Absent a showing of evidence to the contrary, the ordinarily skilled artisan would reasonably expect this to be extended to a chemically homologous composition such as polyaphrons.

For these reasons, Applicants' arguments are found unpersuasive. Said rejection is therefore **maintained**.

All claims under consideration remain rejected; no claims are allowed.

CONCLUSION

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

CORRESPONDENCE

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey T. Palenik whose telephone number is (571) 270-1966. The examiner can normally be reached on 7:30 am - 5:00 pm; M-F (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert A. Wax can be reached on (571) 272-0623. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey T. Palenik/
Examiner, Art Unit 1615

/Carlos A. Azpuru/
Primary Examiner, Art Unit 1615